

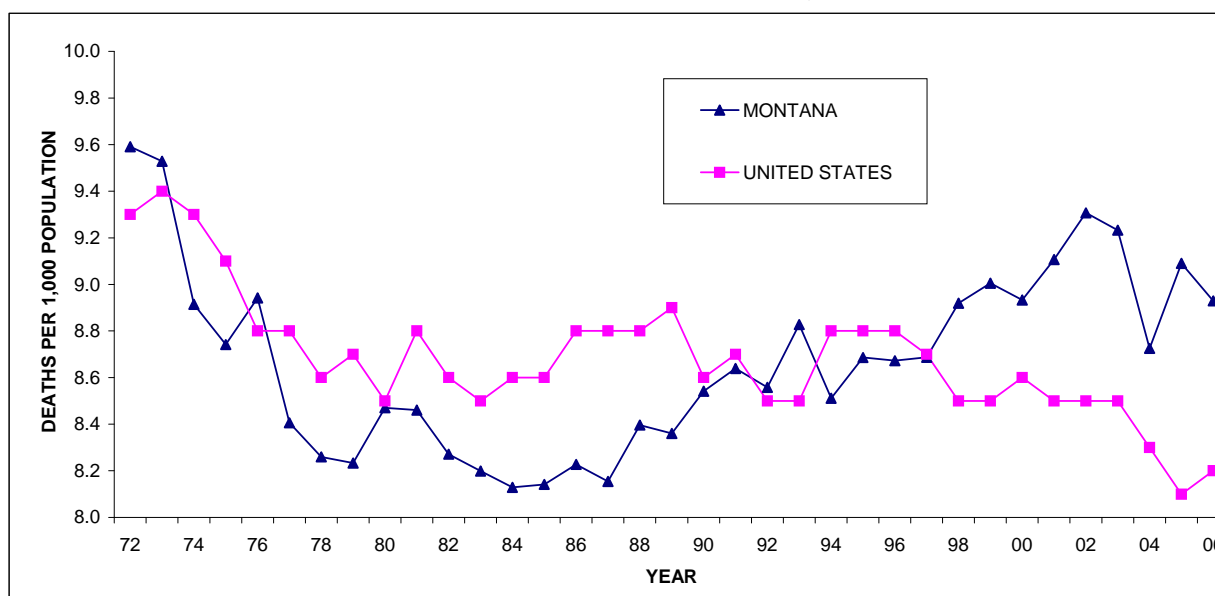
MORTALITY

Montana's crude annual resident mortality rate in 2006 was 8.9 per 1,000 estimated midyear population. There were 8,435 Montana residents who died in that year and their median age was 78 years. Of these people 4,273 (50.7%) were males 4,162 (49.3%) were females.

Figure 13 shows the crude death rates per 1,000 population for Montana and U.S. residents from 1971 through 2006. Montana's annual rate followed the national trend fairly closely throughout most of this period. However, there were notable differences, particularly in the 1980s and since the late nineties. Montana's rate displayed no consistent trend from 1971 to 1973, averaging about 9.6 deaths per 1,000 population. Montana and U.S. rates dropped precipitously beginning in the early 1970s. Montana's rate, for the most part, has been rising since the mid-1980s.

Figure 13

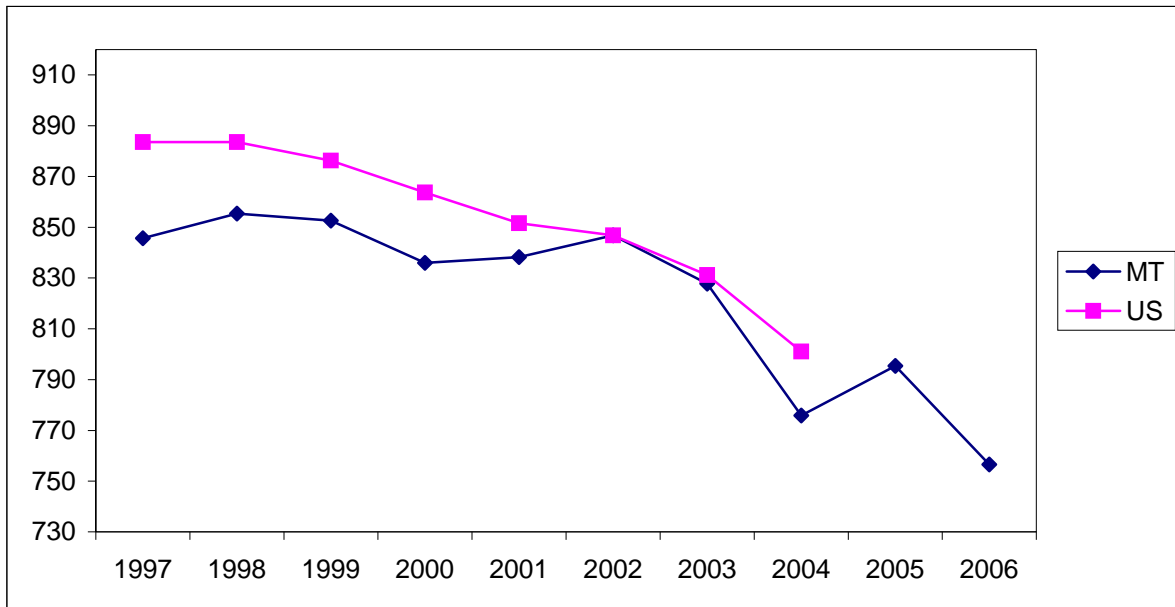
RESIDENT CRUDE DEATH RATES MONTANA AND THE UNITED STATES, 1971 – 2006



The rate of death is closely related to the age structure of the resident population. It is therefore useful to adjust this rate for differences in the age distributions of populations when comparing death rates between those populations. (See the definition of “age adjusted death rate” in the DEFINITIONS section of this report for a description of the mathematics of age adjustment and also see the section on AGE-SPECIFIC AND AGE -ADJUSTED DEATH RATES below for discussion of their proper use.) While the crude death rate represents the absolute risk of death in a single population at a particular time, the age-adjusted rate offers a better comparison of the relative risk of death between populations in different geographic areas at a single time or in the same geographic area at different times.

Figure 14

**AGE-ADJUSTED DEATH RATES*
MONTANA AND UNITED STATES RESIDENTS, 1997-2006****



* Adjusted with the direct method to the projected 2000 U.S. population.

Figure 14 shows the age-adjusted death rates for Montana and U.S. citizens for the last 10 years. It is notable that while Montana's crude death rate (reflecting the absolute risk of death among the resident population) has been generally increasing, the age-adjusted rate (which reflects relative risk by adjusting for the age of the population and the age of its decedents) has been generally declining over the ten years profiled. It is also notable that the age-adjusted rate for Montana was lower than the U.S. rate for all but one of the years profiled, averaging about 97.8% of the national rate.

Whites typically died at an older age than Native Americans. The age at death for whites was several years greater than that for Native Americans at every quartile (25th percentile, median, and 75th percentile). Particularly striking was the fact that one quarter of the white decedents died at or below the age of 67, while one quarter of the Native American decedents died at or below the age of 42 years.

There was greater variability in the age at death for the Native American population than for the white population. The standard deviation, which measures the distribution around the mean, was greater for the Native Americans (23.2) compared to whites (17.8); thus, a larger proportion of Native Americans died at younger-than-average or older-than-average ages than did whites.

In general, female decedents were older than male decedents; the mean and median ages at death were greater for women than for men, regardless of race. For white women, the median age was 82 years, compared to 75 years for white men. The median age for Native American women was 65 years, compared to 57 years for Native American men. **Figure 15** summarizes the distribution of age at death for Montana residents by sex and race for the ten-year period, 1997 to 2006.

Figure 15

**AGE AT DEATH IN YEARS BY SEX AND RACE
CENTRAL TENDENCY AND DISPERSION*
MONTANA RESIDENTS, 1997–2006**

RACE AND SEX	NUMBER OF DEATHS	MINIMUM AGE	25 TH PERCENTILE	MEDIAN AGE	75 TH PERCENTILE	MAXIMUM AGE	MEAN AGE	STANDARD DEVIATION
ALL RACES								
TOTAL	82,022	0	65	78	86	112	73.2772	18.5772
MALE	41,819	0	61	75	83	107	69.8811	19.0534
FEMALE	40,202	0	70	81	88	112	76.8118	17.3742
WHITE								
TOTAL	77,419	0	67	79	86	112	74.2522	17.7828
MALE	39,216	0	63	76	84	107	70.9522	18.2464
FEMALE	38,202	0	71	82	89	112	77.6416	16.6219
NATIVE AMERICAN								
TOTAL	4,029	0	42	60	74	104	56.3232	23.1506
MALE	2,274	0	38	57	71	102	53.2339	22.9658
FEMALE	1,755	0	47	64	78	104	60.3259	22.7794
OTHER RACES								
TOTAL	574	0	47	67	80	101	60.7805	24.5156
MALE	329	0	43	61	77	101	57.2644	24.6282
FEMALE	205	0	55	73	82	101	66.1756	23.8191

*The *mean* is the arithmetic average, the *median* is the midpoint. To illustrate, one quarter of the decedents died at or under the age at the *25th percentile*; half at or under the age at the *median* (or *50th percentile*) etc. The *standard deviation* measures the concentration of the distribution around its mean.

FETAL, INFANT, AND MATERNAL DEATHS

Table S-1 of the Vital Statistics reference tables shows the frequency and crude rate or ratio of all deaths and of fetal, infant, and maternal deaths occurring in Montana (regardless of place of residence) at five-year intervals from 1910 to 1949 and yearly from 1950 through 2006 for deaths of Montana residents (regardless of place of occurrence).

Figure 16

**FIVE-YEAR INFANT MORTALITY RATES AND FETAL MORTALITY RATIOS
MONTANA RESIDENTS, 1981 – 2006**

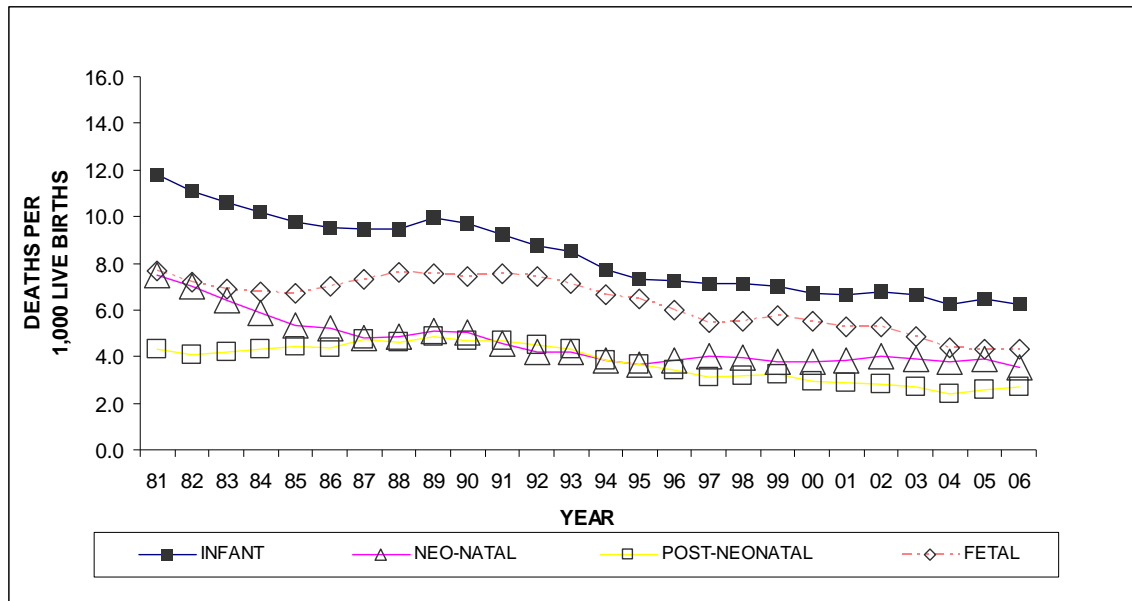


Figure 16 shows the five-year infant and fetal mortality rates for Montana residents from 1981 through 2006. There was a substantial decline in the five-year infant death rate during this period. This rate, the number of infant deaths per 1,000 live births, decreased from 11.8 in 1981 to 6.2 in 2006, or about 47%. The five-year death rate for infants dying in the neonatal period, the first 27 days of life, decreased by more than half (52.9%) during this period. The rate for post-neonatal infants (infants 28 days and older) declined by about one-third (37.0%), falling from 4.3 to 2.7 per 1,000 live births. The five-year fetal mortality ratio also declined by a little more than two-fifths (44.2%), falling from 7.7 deaths per 1,000 live births in 1981 to 4.3 in 2006.

There were 49 resident fetal deaths and 70 resident infant deaths in Montana in 2006. Frequencies of infant and fetal deaths by Montana county of occurrence and residence appear in **Table S-2**. **Table S-3** shows the frequency of fetal deaths by the mother's race and county of residence. The number of infant deaths and five-year infant mortality rates by Montana County of residence appear in **Table D-8**.

Selected causes of death by age and sex for Montana resident infants are shown in **Table D-1** and in **Table D-7**. (See **Figure 2** in the introduction for a complete listing of all 358 potential causes that could appear in **Table D-1**. See **Figure 4** for a complete list of the 130 potential causes that could appear in **Table D-7**.) Sudden infant death syndrome (SIDS), certain conditions originating in the perinatal period, and congenital malformations, deformations, and chromosomal anomalies caused more than two-thirds (67.1%) of all infant deaths in 2006.

Table F-1 shows the frequency of fetal deaths by race, sex, gestational age, and selected cause of fetal death. (See **Figure 5** for a complete list of the 124 potential causes that could appear in **Table F-1**.) **Table S-4** shows the frequency of fetal, infant, and child deaths by county of residence.

AGE-SPECIFIC AND AGE-ADJUSTED DEATH RATES

Most death rates presented in this report are crude rates, unadjusted for demographic factors such as age, sex, or race that will likely affect the risk of mortality. Crude cause-specific rates express the frequency of mortality from a certain underlying cause of death as a proportion of the resident population. They express the risk (average chance) of dying from the specific cause of death cited. They are useful in making comparisons, within a single resident population, of the mortality risks associated with different causes. However, their use for comparisons between populations--the Montana resident population in different years, for instance--is limited. (Because the resident populations of Montana in different years had different age compositions and contained different individuals, they can be considered different populations.)

In the past, the resident population of Montana (and of the Nation) was considerably younger than it is now; younger residents represented a smaller percentage of the population in the first years of the 21st Century than they did only a decade before. In such cases, age-adjustment is helpful for a more meaningful comparison of mortality rates.

Age-adjusted death rates should be interpreted as index numbers rather than direct measures of mortality risk. They are useful for making comparisons between populations (where demographic variables such as the overall age of the population may differ), but not for making comparisons within any single population. They are designed to “adjust” for differences in the age compositions of resident populations in different years by applying observed (i.e. actual) age-specific mortality rates to a hypothetical population with an unchanging age composition. By standardizing in this way, age-adjusted death rates help address issues such as whether an increasing or decreasing death rate is due merely to an aging population or whether some other factors are involved.

For instance, one can compare the Montana age-adjusted death rates for heart disease in different years in order to identify any trends in mortality. It is inadvisable, however, to compare the age-adjusted rate for heart disease to that for cancer within any given year, or from one year to another. While it is tempting to be concerned with the numerical value of the age-adjusted rate, this is also inadvisable because of the sensitivity of the quantitative value to the choice of a standard population.

Figures 17 through 46 display age-adjusted and age specific death rates for several of the leading causes of death in Montana and/or the United States. The age-adjusted rates are adjusted with the direct method to the projected U.S. population for the year 2000. As with any summary statistic, age-adjusted death rates mask much of the underlying complexity in the mortality experience of the population. Hence, Montana’s age-specific death rates are also shown for each cause of death displayed.

Because of the small number of deaths in certain age categories, many of the age-specific rates (e.g. those for chronic liver disease and cirrhosis, motor vehicle accidents, and suicide) may be statistically unstable or present somewhat confusing patterns. However, for several causes of death, such rates present a clear pattern and add useful information about the burden of particular causes of death among the age groups. Age-specific rates for all causes of death are represented here so the reader can judge their usefulness for him or herself.

When analyzing trends in cause-specific age-adjusted death rates, one should remember that the change from one revision of ICD to another (from the ICD-9 to ICD-10 in this case) can dramatically affect the apparent rates for some underlying causes of death, since different revisions (and subsequent changes in rules of classification and selection) can result in different underlying causes for a death record. Underlying causes of death were determined using the conventions of ICD-9 in the years prior to 1999 and the conventions of ICD-10 thereafter. This change is marked in the following graphs with a vertical bar.